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# Effect of Removal of Runners and Flowers from Day-neutral Strawberries on Time of Harvest and Total Yields

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**Abstract**
Day-neutral strawberries can produce fruit during the summer and fall when regular strawberry production has ceased, thereby diversifying fruit production. In Iowa and the Midwest, cultural practices suggest the removal of flowers and runners until early July, but little information is known about cultural practices to shift production to cooler times of the summer and fall. Removing flowers and runners requires additional labor throughout the season. This study compares the production practices of removing flowers and runners and how those practices affect total fruit production, average berry size, and plant biomass.

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**Disciplines**
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**RFR-A9042**

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## Introduction

Day-neutral strawberries can produce fruit during the summer and fall when regular strawberry production has ceased, thereby diversifying fruit production. In Iowa and the Midwest, cultural practices suggest the removal of flowers and runners until early July, but little information is known about cultural practices to shift production to cooler times of the summer and fall. Removing flowers and runners requires additional labor throughout the season. This study compares the production practices of removing flowers and runners and how those practices affect total fruit production, average berry size, and plant biomass.

## Materials and Methods

Bare-root day-neutral strawberry cultivars Albion, Seascape, and Tribute were planted May 7, 2009 at the Horticulture Research Station, Ames, IA. Fourteen plants were placed on white-on-black plastic in a double row spaced 12 in. apart in each plot. Cultivars were randomly blocked in four replications. Rows were spaced 6-in. on center. The production techniques of runner and flower removal included 1) runner removal until July 31 and flower removal until May 31, 2) runner removal until July 31 and flower removal until June 30, 3) runner and flower removal until July 31, 4) no runner removal and flower removal until May 31, 5) no runner removal and flower removal until June 30, and 6) no runner removal and flower removal until July 31. Yield data were collected when fruit ripened in July until frost in October. Plant biomass was collected from three plants by harvesting runners, removing the roots of the runners and mother plants, and drying at room temperature (70$^{o}$F).

## Results and Discussion

Strawberry fruit began to ripen July 8 for treatments with flower removal until May 31, July 29 for treatments with flower removal until June 30, and August 14 for treatments with flower removal until July 31 (data not shown). The 2009 growing season was fairly cool, especially in the month of July, and assisted strawberry growth in general. In warm-to-hot years, strawberry fruit in the month of July could result with less berries formed and fruit with sunscald. Overall, fruit quality was very good and disease was not prevalent in 2009.

The treatment of no runner removal and flowers removed until July 31 showed the highest total berry weight and total berry count for Tribute, and there were no differences in average berry size compared with other treatments (Table 1). There were no differences among treatments for berry weight, berry count, or average berry weight of Seascape (Table 1). The treatment of runner and flower removal until July 31 showed the highest total berry weight for Albion. Total berry counts were higher among all treatments for Tribute compared with Seascape or Albion, but the average berry weight for Tribute was half the average berry weight for Albion. Higher average berry weights make

day-neutral strawberries more competitive in the market place. In general among all cultivars, average berry size and total berry yield were higher when runners and flowers were removed until the end of July.

Runner number and dry weight were generally highest in treatments that did not receive runner removal. There also were higher runner numbers and dry weights from plants that had runners and flowers removed until May 31 and June 30 (Table 1). Mother plant weights were generally highest for Tribute. Due to smaller plants with Seascape and Albion, producers may want to plant the strawberry plants closer together, such as 6 in. to 9 in. instead of 12 in. to increase overall production within an area.

**Acknowledgements**

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**Table 1. Total berry yield, average berry weight, and runner and mother plant biomass from six cultural techniques of runner and flower removal from July to October 2009.[x]**

| Cultivar | Treatments[z] | Total berry weight per plot[y] (g) | Total berry count per plot | Average berry weight (g) | Runner number per plant | Total runner weight per plant (g) | Average mother plant weight (g) |
|---|---|---|---|---|---|---|---|
| Tribute | RR / FR May 31 | 1802.0 [x] bcde | 338.75 b | 5.32 d | 9 bcd | 20.07 def | 65.79 abc |
| | NRR / FR May 31 | 2250.2 ab | 408.50 ab | 5.51 d | 10 bcd | 27.41 cdef | 96.12 a |
| | RR / FR June 30 | 1863.2 abcd | 350.50 ab | 5.23 d | 13 bc | 25.54 cdef | 85.54 abc |
| | NRR / FR June 30 | 2203.6 ab | 401.50 ab | 5.45 d | 10 bcd | 38.73 bcd | 94.76 ab |
| | RR / FR July 31 | 2183.0 ab | 363.00 ab | 6.07 d | 1 d | 1.10 f | 64.24 abc |
| | NRR / FR July 31 | 2449.3 a | 418.00 a | 5.85 d | 13 bc | 33.36 bcde | 76.11 abc |
| Seascape | RR / FR May 31 | 1178.8 f | 139.50 c | 8.38 c | 14 ab | 47.50 abcd | 52.10 c |
| | NRR / FR May 31 | 1293.1 edf | 144.50 c | 8.97 c | 17 ab | 41.63 bcd | 68.66 abc |
| | RR / FR June 30 | 1310.8 cdef | 141.25 c | 8.91 c | 25 a | 75.81 a | 79.37 abc |
| | NRR / FR June 30 | 1249.0 ef | 135.75 c | 9.24 c | 9 bcd | 25.89 cdef | 74.59 abc |
| | RR / FR July 31 | 1314.2 cdef | 148.00 c | 8.73 c | 3 cd | 6.19 ef | 53.21 c |
| | NRR / FR July 31 | 1342.3 cdef | 149.00 c | 8.96 c | 17 ab | 34.08 bcde | 69.05 abc |
| Albion | RR / FR May 31 | 1258.3 ef | 116.00 c | 10.76 ab | 13 bc | 49.04 abcd | 51.87 c |
| | NRR / FR May 31 | 1181.6 f | 110.75 c | 10.63 b | 13 bc | 41.81 bcd | 50.11 c |
| | RR / FR June 30 | 1343.1 cdef | 120.25 c | 11.11 ab | 16 ab | 46.77 abcd | 58.36 abc |
| | NRR / FR June 30 | 1302.7 cdef | 114.50 c | 11.36 ab | 15 ab | 56.26 abc | 60.35 abc |
| | RR / FR July 31 | 1899.0 abc | 158.25 c | 12.03 a | 1 d | 1.34 f | 80.86 abc |
| | NRR / FR July 31 | 1290.4 edf | 115.00 c | 11.06 ab | 18 ab | 61.50 ab | 56.22 c |
| | LSD $P \leq 0.05$[w] | 602.45 | 77.08 | 1.29 | 11 | 32.01 | 39.79 |

[z]RR = runner removal; NRR = no runner removal; FR = flower removal.

[y]Total plot size was 14 total plants or 14 sq ft.

[x]Means are average four treatment replications.

[w]Least significant difference at $P \leq 0.05$; NS = no statistical difference; values sharing the same letter are not statistically different from each other.